FACT SHEET

L-1381

CALCIUM

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There is a lack of calcium in the diets of many persons. People need this important mineral throughout their lives to keep bones and teeth healthy. Most Americans consume less than the recommended amounts of milk group foods—the primary sources of calcium.

Functions of Calcium in the Body

Calcium is the most abundant mineral in the body. About 99 percent of the body's calcium is present in the bones, and 1 percent in soft tissues (muscles, nerves, skin and connective fibers).

Calcium regulates several body processes in the soft tissues. It helps clot the blood, regulate the heart beat, and regulate nervous and muscular systems.

Bone is constantly re-formed and broken down (process of resorption) throughout life. During the growth years, more bone is formed than destroyed. In the aging process when bones become porous, bone is destroyed faster than it is formed.

Abundant amounts of calcium in the diet are necessary for good development of the bones. Ends of the bones contain needle-like deposits or spikes of bone mineral, blood vessels and fatty material. Proper development of this network of bony material requires that the necessary amount of calcium be provided by the blood. The network of the bony material develops as shown in Figure 1. The needle-like spikes of bone mineral will be poorly developed if you omit calcium from the diet for long periods of time. Bones with a low calcium content are weaker and break easier than well-formed bones.

In teeth, calcium and phosphorus form crystals similar to those in bones to give them strength. These minerals in the diet are directly related to the hardness of the outer covering of the tooth (enamel).

Unlike bone, the minerals in teeth are deposited and withdrawn at a very slow rate. Tooth enamel has no capacity for repair once teeth become decayed or broken.

Need for Calcium

The National Research Council's Recommended Dietary Allowances for calcium are set at 800 milligrams to insure that bones contain enough calcium for strength. During periods of rapid growth (including adolescence, pregnancy and lactation), the need for calcium is increased to 1200 milligrams.

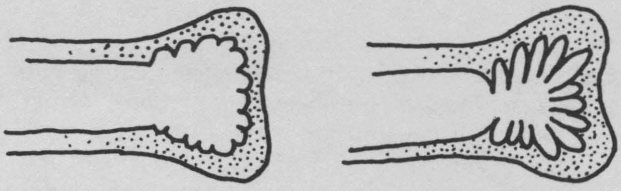

Figure 1. Diagram of bone showing poor and good development, depending on whether the calcium in the diet is low or liberal.

Eat recommended amounts of foods from the Daily Food Guide everyday to insure that your body is supplied with the proper amounts of all nutrients necessary for good health, including calcium. To meet the Recommended Dietary Allowance of 800 milligrams daily, adults and children under 9 years of age require 2 cups of milk daily plus a variety of other foods. Children 9 to 12 years of age and pregnant women can fulfill the increased calcium need during rapid growth by drinking 3 or more cups of milk daily. Teenagers and nursing women should consume 4 or more cups of milk daily plus a variety of other foods.

Food Sources of Calcium

Important food sources of calcium in the United States are milk and other milk group foods, such as cheese, cottage cheese and custard. Two or more servings of milk and milk group foods provide 75 percent of the calcium needed. When milk group foods are restricted in diet due to allergies, intolerances or dislikes, it is difficult to provide enough calcium from other foods. If calcium is severely limited in your diet, discuss this with your doctor.

Other good sources of calcium are dried fruits, leafy green vegetables, molasses and dried beans. You can obtain 15 percent of the needed calcium by eating four or more servings of the fruit and

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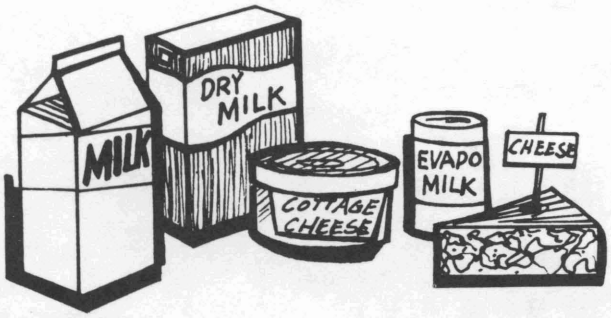

Milk and other milk group foods including cheese, cottage cheese and custard are major sources of calcium.

vegetable group foods; 10 percent from eating two or more servings of the meat group foods. Other food sources of calcium are eaten in small quantities. For example, it takes about 5½ heads of lettuce, or 3½ pounds of liver, or 22 eggs, or 8 ounces of cooked collards to provide the 570 milligrams of calcium. It is much simpler to drink two cups of milk a day for the same amount of calcium.

Selected foods in each food group and their calcium content are listed in Table 1.

Lack of Calcium in the Diet

A diet low in calcium may result in an abnormal heartbeat. This deficiency may affect the nervous system by causing heart muscles to contract repeatedly with twitching, muscle cramps, and even convulsions, referred to as tetany. In addition, the blood may not clot normally when calcium is deficient.

Less than normal intakes of calcium may result in poorly developed teeth and bones in children. If the minerals, calcium and phosphorus are severely lacking during this period, bones will be stunted, resulting in a deformed and frail body. Calcium deficiency after the growth period will show fewer outward effects.

Lack of calcium in the diet may be one cause of the bone disorder osteoporosis in which bones become thin and porous. This disease often affects men and women during middle and old age. Many times people do not know they have this disease until their bones break in a minor accident. Osteoporosis cannot be detected by x-ray until 25 to 50 percent of the calcium in the bones is lost. Pain may be present either in one area, or over the entire body if the spine is affected.

Other factors which may cause osteoporosis are lack of protein in the diet, lack of hormones and lowered calcium absorption. Lack of calcium is a contributing factor to the onset of this disease, but many aspects of the disease remain a mystery.

TABLE 1. CALCIUM CONTENT OF FOODS

	Serving Size		Calcium
Milk Group	MEASURE	GRAMS	MILLIGRAMS
Fluid, whole	1 cup	244	288
non fat (skim)	1 cup	245	296
lowfat skimmed (2%)	1 cup	246	352
Cheese, cheddar	1 oz.	28	213
Cheese, cottage, creamed	1 cup	245	230
Custard, baked	1 cup	265	297
Fruit and Vegetable Group			
Blackeyed peas, cooked	½ cup	80	1.7
Collards, cooked	½ cup	95	144.5
Lettuce, iceberg	¼ head	227	23
Tomatoes, raw	1 tom.	200	24
Applesauce, canned	½ cup	177	5
Dried apricots, uncooked	¼ cup	37	25
Blackberries, raw	½ cup	72	23
Dates, pitted	¼ cup	44.5	26
Frozen orange juice, diluted	½ cup	124	12.5
Breads and Cereals			
White, enriched	1 slice	25	21
Whole wheat, enriched	1 slice	28	24
Farina, quick type	½ cup	122.5	73.5
Macaroni, cooked	½ cup	70	4
Macaroni and cheese	½ cup	100	181
Pizza	1 sector (5½-inch)	75	107
Meat Group			
Beef, lean, cooked	2.5 oz.	72	10
Eggs, whole	1 egg	50	27
Chicken, cooked	3 oz.	85	8
Liver, beef, fried	2 oz.	57	6
Pork, lean, cooked	1.7 oz.	48	7
Fish, baked	3 oz.	85	25
Oysters	½ cup	120	113
Beans, dried (red kidney)	½ cup	127.5	37
Blackeyed peas, dried	½ cup	124	21
Peanut butter	2 tbsp.	32	18
Other Foods			
Molasses, cane, light	1 tbsp.	20	33
Sorghum	1 tbsp.	21	35
Honey	1 tbsp.	21	1

References

Home and Garden Bulletin No. 72, *Nutritive Value of Foods,* 1964.

Sweeten, Mary Kinney, *"The Effect of Calcium Deprivation in the Diet of White Rats,"* unpublished Master's thesis, Oklahoma State University, 1969.

Robinson, Corinne H., *Proudfit-Robinson's Normal and Therapeutic Nutrition,* 13th edition, MacMillan Company, 1967.

Wilson, Fisher, Fuqua, *Principles of Nutrition,* Wiley and Sons, London, 1960.

Chaney, Margaret, *Nutrition,* 6th edition, Boston, 1961.

Acknowledgment

The author gratefully acknowledges the assistance of Frances Reasonover, Sally Springer and Marilyn Haggard, Extension foods and nutrition specialists, The Texas A&M University System, in the preparation of this publication.

Cooperative Extension Work in Agriculture and Home Economics, The Texas A&M University System and the United States Department of Agriculture cooperating. Distributed in furtherance of the Acts of Congress of May 8, 1914, as amended, and June 30, 1914.

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